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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,643	11/21/2003	Vanu G. Bose	MTV-020.03	1258
25181	7590	01/03/2007		
FOLEY HOAG, LLP PATENT GROUP, WORLD TRADE CENTER WEST 155 SEAPORT BLVD BOSTON, MA 02110			EXAMINER PHU, PHUONG M	
			ART UNIT	PAPER NUMBER
			2611	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/03/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/719,643

Applicant(s)

BOSE ET AL.

Examiner

Phuong Phu

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/22/04
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because of the following.

-In figures 1, 2, and 5, blocks should be labeled with corresponding functional names.

For instance, in figure 1, block (18) is suggested to be labeled with "Memory", block (20) with "Input/Output Device", etc.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 2611

3. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-Claim 1 recites the limitation “a wideband signal”. It is not clear in which sense or context the relative term “wideband” has to be interpreted in order to distinguish a wideband signal with other bandwidth signals.

-Claim 1 recites the limitation “a high sampling rate digital signal”. It is not clear in which sense or context the relative term “high sampling rate” has to be interpreted in order to distinguish a high sampling rate digital signal with other sampling rate digital signals.

-Claim 1 recites the limitation “A method of processing radio signals, comprising converting between a wideband signal and a high sampling rate digital signal, under control of a direct memory access controller in communication with a processor, storing samples of the high sampling rate digital signal directly into an application memory space without interrupting the processor, said application memory space being accessible by a computer program; processing the high sampling rate digital signal samples under control of the computer program”.

The claim omits functional/structural interrelationships of procedures “converting between a wideband signal and a high sampling rate digital signal, under control of a direct memory access controller in communication with a processor, storing samples of the high sampling rate digital signal directly into an application memory space without interrupting the processor, said application memory space being accessible by a computer program; processing the high sampling rate digital signal samples under control of the computer program” with

Art Unit: 2611

elements “radio signals”, and therefore omits functional/structural interrelationships with procedure “processing radio signals” that the claim intends to claim for.

The claim omits functional/structural interrelationships of procedure “processing the high sampling rate digital signal samples under control of the computer program” with procedure “storing samples of the high sampling rate digital signal”. The omission makes it unclear whether the procedure “processing the high sampling rate digital signal samples under control of the computer program” is carried out before procedure “storing samples of the high sampling rate digital signal” or whether it is carried out after the procedure “storing samples of the high sampling rate digital signal”.

-Claims 5 and 6 recite the limitation “the digitized IF signal”. The limitation is lack of antecedent basis.

-Claim 5 recites the limitation “modulating a signal to the digitized IF signal”. Claim 5 omits functional/structural interrelationships of procedure “modulating a signal to the digitized IF signal” with procedures “processing the high sampling rate digital signal samples under control of the computer program”, “converting between a wideband signal and a high sampling rate digital signal” and “storing samples of the high sampling rate digital signal”, previously recited in claim 1, for making the claimed method as a completely operative method.

-Similarly, claim 6 omits functional/structural interrelationships of procedure “demodulating a signal to the digitized IF signal” with procedures “processing the high sampling rate digital signal samples under control of the computer program”, “converting between a wideband signal and a high sampling rate digital signal” and “storing samples of the high

Art Unit: 2611

sampling rate digital signal”, previously recited in claim 1, for making the claimed method as a completely operative method.

-Similarly, claim 7 omits functional/structural interrelationships of procedure “channel selection” with procedures “processing the high sampling rate digital signal samples under control of the computer program”, “converting between a wideband signal and a high sampling rate digital signal” and “storing samples of the high sampling rate digital signal”, previously recited in claim 1, for making the claimed method as a completely operative method.

-Claim 10 recites the limitation “converting, in an analog domain, between a radio frequency signal and an analog intermediate frequency signal; converting between the analog intermediate frequency signal and corresponding digitized intermediate frequency signal data; buffering the digitized intermediate frequency signal data in a buffer; under control of a direct memory access controller in communication with a processor, transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting the processor; and processing the digitized intermediate frequency signal data in a computer program”. The claim omits functional/structural interrelationships of procedure “processing the digitized intermediate frequency signal data in a computer program” with procedures “buffering the digitized intermediate frequency signal data in a buffer” and “transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting the processor”. The omission makes it unclear whether the procedure “processing the digitized intermediate frequency signal data in a computer program” is carried out before both procedures “buffering the digitized intermediate frequency signal data in a buffer” and “transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting

Art Unit: 2611

the processor”, or whether after procedure “buffering the digitized intermediate frequency signal data in a buffer” and before procedure “transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting the processor”, or whether after the two procedures “buffering the digitized intermediate frequency signal data in a buffer” and “transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting the processor”.

-Claims, (if any) depended on above claims, are therefore also rejected.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,654,428, in view of Dickens (5,216,621), provided in the IDS filed on 11/22/04.

Art Unit: 2611

-Regarding to claim 1, claim 1 of U.S. Patent No. 6,654,428 teaches a method comprising:

procedure (see col. 16, lines 30-33) of converting between a signal (analog intermediate frequency signal), (considered here equivalent with the limitation “wideband signal”, and hereafter called so), and a sampling rate digital signal (digitized intermediate frequency signal data”, (considered here equivalent with the limitation “high sampling rate digital signal” and hereafter called so);

procedure (see col. 16, lines 34-35) of storing samples of the high sampling rate digital signal directly into an application memory space (buffer); and

procedure (see col. 16, lines 39-40) of processing the high sampling rate digital signal samples under control of a computer program (computer program).

Claim 1 of U.S. Patent No. 6,654,428 does not teach that the samples of the high sampling rate digital signal are stored directly in to the application memory space under control of a direct memory access controller in communication with a processor without interrupt the processor, the application memory space being accessible by the computer program, as claimed.

Dickens teaches procedure (41₁, 41₂, 41₃) of storing data into an application memory space (41₁, 41₂, 41₃), under control of a direct memory access controller (40, 32) in communication with a processor (30) without interrupt the processor, the application memory space being accessible by a computer program (32) (see figures 1 and 2, and col. 4, line 3 to col. 5, line 56).

Since claim 1 of U.S. Patent No. 6,654,428 does not teach in detail how the samples of the high sampling rate digital signal are stored, for an application, it would have been obvious for

one skilled in the art to implement the invention of claim 1 of U.S. Patent No. 6,654,428 in such a way that the procedure of storing would store the samples of the high sampling rate digital signal directly in to the application memory space under control of a direct memory access controller in communication with a processor without interrupt the processor wherein the computer program is accessible to said application memory space, as taught by Dickens so that the high sampling rate digital signal would be stored and accessed for processing as required.

6. Claim 10 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 2 of U.S. Patent No. 6,654,428 . Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following.

-Regarding to claim 10, claim 2 of U.S. Patent No. 6,654,428 teaches a method comprising:

procedure (see col. 16, lines 51-53) of converting, in an analog domain, between a radio frequency signal and an analog intermediate frequency signal;

procedure (see col. 16, lines 55-57) of converting between the analog intermediate frequency signal and corresponding digitized intermediate frequency signal data;

procedure (see col. 16, lines 58-59) of buffering the digitized intermediate frequency signal data in a buffer;

procedure (see col. 16, line 60 to col. 17, line 7), under control of a direct memory access controller (direct memory access controller) in communication with a processor (processor), of transferring, in page multiples, pages of digitized IF signal data between the buffer and memory without interrupting the processor until a number of page addresses in a list falls between a predetermined threshold; and

procedure (see col. 16, lines 63-64) of processing the digitized intermediate frequency signal data in a computer program.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Dickens.

-Regarding to claim 1, see figures 1 and 2, and col. 3, line 61 to col. 5, line 56, Dickens discloses a method (see figures 1 and 2) of processing signals (16), comprising:

procedure (18) of converting between a signal (16), (considered here equivalent with the limitation “wideband signal”) and a sampling rate digital signal (22, 28), (considered here equivalent with the limitation “high sampling rate digital signal”) (see col. 4, line 3 to col. 5, line 56);

procedure (41₁, 41₂, 41₃), under control of a direct memory access controller (40, 32) in communication with a processor (30), of storing samples of the high sampling rate digital signal directly into an application memory space (41₁, 41₂, 41₃) without interrupting the processor, said application memory space being accessible by a computer program (32) (see col. 4, line 3 to col. 5, line 56); and

procedure (40) of processing the high sampling rate digital signal samples under control of the computer program (see col. 5, lines 30-45).

-Regarding to claim 2, Dickens discloses that the sampling is continuous (see (18) of figure 1).

-Regarding to claim 7, Dickens discloses a channel selection “digital filter” (see col. 4, lines 26-51).

-Regarding to claim 8, Dickens discloses procedure (40, 32) of maintaining, in the direct memory access controller, a list of physical page addresses “map of memory zone” (see col. 5, line 54) associated with buffers (41₁, 41₂, 41₃) in memory; procedure (34) of reading a page address from the list, procedure (28, 40) of transferring, between an input/output device (PC BUS) and memory (41₁, 41₂, 41₃) to which the page address is associated, the high sampling rate digital signal samples; and repeating continuously the above reading and transferring steps (see figures 1-3, col. 5, line 25 to col. 7, line 17).

9. Claims 1, 2, 5, 6, 7 and 10 are rejected, under 35 U.S.C. 102(e), as being anticipated by Pietzold, III et al (6,091,765).

-Regarding to claim 1, see figures 2, 4A, 4B, 5, 6, 49, 61A and 61B, and col. 6, line 1 to col. 7, line 30, col. 8, line 20 to col. 10, line 6, col. 29, line 19 to col. 32, lines 38, Pietzold, III et

Art Unit: 2611

al discloses a method (see figures) of processing signals (inputted to (129) or outputted to (130) (see figure 5)), comprising:

procedure (comprising (129, 130) (see figure 5) and (134) (see figure 6)) of converting between a signal (inputted to (129) or outputted to (130)), (considered here equivalent with the limitation “wideband signal”, and hereafter called so) and a sampling rate digital signal (outputted from (134) and inputted to (204)), (considered here equivalent with the limitation “high sampling rate digital signal” and hereafter called so), (see figure 6);

procedure (204), under control of a direct memory access controller (137) in communication with a processor (FPGA), of storing samples of the high sampling rate digital signal directly into an application memory space (204) without interrupting the processor, said application memory space being accessible by a computer program (inherently included and associated with (CSSSP/DMA) of (137) (see figure 49, col. 29, line 19 to col. 32, line 36); and

procedure (316, 318) of processing the high sampling rate digital signal samples under control of the computer program via (137) (see figure 49, , col. 29, line 19 to col. 32, line 36).

-Regarding to claim 2, Pietzold, III et al discloses that sampling is continuous (see figure 5).

-Regarding to claim 5, Pietzold, III et al discloses procedure (187) of modulating a signal to a digitized IF signal (see figure 9).

-Regarding to claim 6, Pietzold, III et al discloses procedure (159) of demodulating a signal from a digitized IF signal (see figure 8).

-Regarding to claim 7, Pietzold, III et al discloses a channel selection (127) (see figure 7).

-Regarding to claim 10, as similarly applied to claims 1, 2, 6 and 7 set forth above and herein incorporated, see figures 2, 4A, 4B, 5, 6, 49, 61A and 61B, and col. 6, line 1 to col. 7, line 30, col. 8, line 20 to col. 10, line 6, col. 29, line 19 to col. 32, lines 38, Pietzold, III et al discloses a method for processing a radio signal, comprising:

procedure (127, 131) (see figure 5) of converting, in an analog domain, between a radio frequency signal and an analog intermediate frequency signal;

procedure (comprising (129, 130) of figure 5 and (134) of figure 6) of converting between the analog intermediate frequency signal and corresponding digitized intermediate frequency signal data (inputted to (204) (see figure 6);

procedure (204) (see figure 6 and 49) of buffering the digitized intermediate frequency signal data in a buffer (204); under control of a direct memory access controller (137) (see figures 6 and 49) in communication with a processor (FPGA) (see figure 6), transferring, in page multiples "several streams", pages "streams" of digitized IF signal data between the buffer and memory (312, 318) without interrupting the processor (see col. 29, line 19 to col. 32, line 36).

procedure (316, 318) of processing the digitized intermediate frequency signal data in a computer program via (137) (see figure 49, col. 29, line 19 to col. 32, line 36).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dickens.

Art Unit: 2611

-Regarding to claim 3, Dickens does not teach whether samples are stored at a rate to the sampling rate.

However, teaching of storing data at a rate to the sampling rate of the data is well-known in the art, and the examiner takes Official Notice.

Since Dickens is silent about which rate the samples are stored, for an application, it would have been obvious for one skilled in the art to implement Dickens in such a way that the samples are stored at a rate to the sampling rate of the data so that the data would be stored as required.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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12/1/06

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Art Unit 2611